



Forging Future Flight: Aeronautics Research at the NASA Langley Research Center (Subsonic Rotary Wing Research)

The NASA Langley Research Center (LaRC)

Located in Hampton, VA, LaRC was established as the nation's first civilian-led aeronautics research laboratory in 1917. NASA Langley serves as a world leader in "cutting edge" aeronautics research. Approximately \$180 million was invested in aeronautics research at LaRC



(2011). In 2010 NASA Langley contributed \$946.8 million to the Virginia economy while supporting 8,624 jobs in the state of Virginia. In the Hampton Roads area in 2010, Langley contributed \$886.7 million to the local economy while supporting 7,962 jobs.

Aeronautics Research Directorate (ARD)

The ARD at NASA LaRC manages projects that support four programs: (1) Integrated System Research Program, (2) Fundamental Aeronautics Program, (3) Aviation Safety Program, and (4) Airspace Systems Program. Research activities are performed under the specific projects described later. The NASA LaRC ARD facilitates external partnerships to complement the agency's aeronautics mission.

NASAfacts



Subsonic Rotary Wing Project (Fundamental Aeronautics Program)

This LaRC-led project integrates work at LaRC, Ames Research Center (ARC), and Glenn Research Center (GRC). The work at LaRC includes: wind tunnel studies, developing new measurement technologies, identifying sources of noise external and internal to the vehicle, writing new computational codes to predict rotor performance, and developing structures that resist cracking and damage.

Primary Goal: This project has set aggressive goals to develop technologies that will enable high-speed, efficient rotorcraft in a variety of sizes and configurations to operate routinely in the national airspace. Research is underway to enable improved prediction methods and technologies for increasing cruise speeds, ranges and payloads, while simultaneously decreasing noise, vibration and emissions.

Technical Challenges:

- Integrated Aeromechanics/Propulsion System
- Actively-Controlled, Efficient Rotorcraft
- Quiet Cabin (QC)
- NextGen Rotorcraft
- High Fidelity Validated Design Tools



Recent Research Accomplishments:

Langley researchers, working with the Army and Bell Helicopter, Textron, Inc., completed an acoustic flight test. The noise of a helicopter in various maneuvers was measured for the first time and the acoustic databases will be updated to include this information. The data will be used to design low noise flight approaches for future rotorcraft.

LaRC Facilities and Capabilities Used in Research:

Transonic Dynamics Tunnel (TDT)
14- by 22-Foot Subsonic Tunnel
Rotor Test Cell at 14- by 22-Foot Subsonic Tunnel
Basic Aerodynamics Research Tunnel (BART)
Flow Physics Laboratories
Structural Acoustics Loads & Transmission Facility
Mobile Acoustics Facility
Structures Laboratories
Optical Measurement Development Laboratories



Crash Research to evaluate new energy absorbing material

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For more information about NASA LaRC aeronautics research, visit
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